

PROJECT SPECIFIC

Construction Management, Inspection, Materials Testing and Construction Schedule Analysis

Scope of Work

**FEDERAL AID PROJECT NO. IM 0701-211
CONSTRUCTION PROJECT CODE NO. 18349**

PROJECT NAME: I-70 East of Mack

**LOCATED ON I-70
MP 11.5 to MP 16.0
Grand Junction, Colorado**

Date: February 6, 2012
Region 3

THE COMPLETE SCOPE OF WORK INCLUDES THIS DOCUMENT, ATTACHMENTS AND ANY REFERENCES IDENTIFIED WITHIN.

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SECTION 1

General Requirements:

1.1 General Scope of Work Description:

CDOT is requesting proposals for the construction management, inspection and materials testing for the resurfacing of a portion of I-70 East of Mack Colorado, as further described in this document. In addition, the Consultant will be required to provide analysis of the Contractor's construction schedule during the course of the work. The project is estimated to begin in June 2012 and extend through December 2012.

1.2 Definitions

CDOT Resident Engineer - The CDOT Resident Engineer is responsible to the Region Program Engineer for the quality and successful completion of a transportation project. The Resident Engineer authorizes interim and final payments and all changes to Contracts for all Consultants and Contractors.

CDOT Project Coordinator - The CDOT Project Coordinator reports to the Resident Engineer, has project access to Site Manager, monitors Construction Traffic Control, reviews payroll submittals, and performs duties as assigned.

Contractor - The individual, firm or corporation contracting with CDOT to construct the transportation project.

Consultant Project Engineer (CPE) – The Consultant Project Engineer is in direct charge of the work and is responsible for the administration and satisfactory completion of the project under contract. The CPE shall be assigned full time on the project site. The Consultant Project Engineer works directly for the CDOT Resident Engineer. The duties of the CPE are limited to those duties in the scope of work and as delegated by CDOT Resident Engineer. The CPE must be licensed in the State of Colorado and is the engineer in responsible charge of construction.

Consultant Assistant Project Engineer (CAPE) – The Consultant Assistant Project Engineer reports to the Consultant Project Engineer to assist in the administration and satisfactory completion of the project under contract. The CAPE works directly for the CDOT Resident Engineer when the CPE is not on the site. The duties of the CAPE are limited to those duties in the scope of work and as delegated by CPE and the CDOT Resident Engineer.

Consultant Inspector, Materials Testing Technician - The Consultant's employees who perform inspection and testing services under the responsible charge of the CPE or CDOT Resident Engineer.

1.3 Other Duties required by the Consultant

The following tasks shall be performed by the Consultant. Cross-over duties by Consultant's project personnel will be allowed provided that they meet all certification requirements for the position and can perform all assigned duties. Duty assignments shall be subject to CDOT approval.

Environmental Compliance Officer (ECO) – The ECO represents CDOT regarding all described duties and shall monitor the Contractor's Environmental compliance. Other duties include but are not limited to:

Responsible for project compliance with Environmental Requirements to minimize all construction related impacts to the unique, natural, visual, and cultural characteristics of the environment. Activities to be monitored may also include environmental monitoring of turbidity, MS4 requirements, and seeding and planting.

Ensure that Contractor complies with wetlands protection and encroachment requirements.

Monitors environmental conditions and BMPs, ensuring that the Stormwater Management plans are properly implemented and maintained.

Construction Traffic Control Coordinator – Monitors the Construction Traffic control, MHT's, flagging, the Contractor's TCS, and coordinates with TCSs on other CDOT projects. Ensures Contractor's Construction Traffic Control is in compliance with the plans, specifications, and MUTCD.

Utility Coordinator – This position to be staffed by CDOT.

Miscellaneous - Provide additional construction and materials' testing services for CDOT Region 3 as directed by the Resident Engineer. Do not proceed with any additional miscellaneous services without explicit direction from the Resident Engineer. Track costs separately for each additional task and report to the Resident Engineer periodically.

1.4 Project Description and Location

Project IM 0701-211, SA# 18349: I-70 East of Mack is described as the resurfacing of I-70 from the Mack Interchange and proceeding east for 4.5 miles to M.P. 16.0.

The proposed project includes milling approximately 1-inch of the existing HMA and then placing a thin 6-inch Concrete White Topping overlay on I-70, removal and installation of guardrail and bridge rail, HMA paving at the Port of Entry locations and Interchange Ramps, and traffic control.

1.5 Work Duration

The estimated time period for the work described in this scope of work covers the period from approx. June 1, 2012 to December 31, 2012. The project will be completed in 2012. The Consultant shall provide Construction management, inspection and testing services during the construction phase of the work unless otherwise directed by the Resident Engineer.

Work may be required day and/or night, on weekends, holidays and/or on a split shift basis. Work weeks may be in excess of or less than the standard 40-hour week.

1.6 Staffing Needs

The associated man hour proposal is based upon the following limitations as directed by CDOT:

- 1- Project Inspector (Concrete paving) – June, 2012 through November, 2012; approx. 1,200 hours
- 1- Project Tester – June, 2012 through November, 2012; approx. 1,200 hours
- 1- Project Engineer - May, 2012 through December, 2012; approx. 1,600 hours

Actual staff size during the project may be modified by the Resident Engineer as required by the work load.

All Consultant construction personnel shall remain assigned to the project site during the construction, unless otherwise directed by the Resident Engineer.

The Consultant will also be required to provide construction schedule review and analysis of the Contractor's progress during the project life.

1.7 Submittals by the Consultant

The Consultant's staff shall be composed of personnel experienced in CDOT project procedures and methods, concrete pavement construction, concrete pipe work, drainage, utility construction, materials testing and inspection, electrical as applicable, schedule review and analysis, environmental compliance, and all types of roadway construction. Resumes and three references are required for all personnel proposed for the project.

1.8 General Work Initial Project Meeting

Project IM 0701-211 will be administered by the CDOT Resident Engineer unless otherwise directed by the CDOT Program Engineer. All support construction staff will be either CDOT or Consultant personnel as assigned by the Resident Engineer. CDOT reserves the right to replace Consultant personnel with available CDOT personnel as CDOT staffing allows.

The Consultant and CDOT project personnel shall meet weekly to coordinate and schedule the required work. The Consultant shall submit a schedule of the Consultant's required scope of work for the project to CDOT for approval. The Consultant shall complete all work in accordance with the approved schedule or as approved by the CDOT Program Engineer or the CDOT Resident Engineer.

1.9 Authorization to Proceed

Work shall not commence until the written Notice to Proceed is received by the Consultant, and shall be completed in the time specified.

1.10 Routine Billing & Reporting

The Consultant shall provide the following on a regular basis:

- 1.) Monthly billing formats, suitable to the CDOT Resident Engineer, for all contract activities performed by the Consultant staff. The Consultant shall submit CDOT Form 10s or a timesheet format approved by CDOT for all Consultant personnel assigned to the project with each monthly billing.
- 2.) Periodic reports and billings required by CDOT Procedural Directive 400.2

1.11 Status of Contract

The consultant shall monitor the financial status of the contract and advise the CDOT Resident Engineer on a weekly basis of any need for supplementing their contract or negotiating an additional task order. Failure to monitor contract status and provide timely notification may result in discontinuation of the consultant's services on the project until a supplemental agreement can be affected.

1.12 Project Standards

All construction management and documentation shall be in accordance with the latest applicable versions of the Colorado Department of Transportation's manuals, e.g., Construction Manual, Field Materials Manual, Colorado Department of Transportation Inspector's Checklist, Standard Specifications for Road & Bridge Construction, the Supplemental Specifications, applicable M & S Standards, and the plans and specifications currently in use when the construction project is advertised or revised under advertisement. All consultant construction management, inspection, or testing activities performed shall be as authorized by the CDOT Resident Engineer. Call CDOT's Bid Plans Room at (303) 757-9313 to order or obtain additional information.

For the purposes of this document, Construction Management, Inspection, and Testing shall be known as "the work" and references to "the specifications" shall include all applicable CDOT Standard Specifications for Road and Bridge Construction including Supplemental Specifications, Project Standard Revisions and Project Special Provisions, and project plans and specifications.

The Consultant shall maintain onsite copies of all applicable CDOT Standard Specifications for Road and Bridge Construction including Supplemental Specifications, Project Standard Revisions and Project Special Provisions, and project plans and specifications.

1.13 Labor, Materials, Vehicles & Equipment

The Consultant Project Engineer shall be experienced and competent in road and bridge construction management, inspection, drainage, traffic control, bridge construction, concrete pavement construction, materials testing, and construction phasing.

The Consultant Project Engineer and Inspector shall have attended and passed the Traffic Control Certification Training within the past two years or attended a refresher course with the past two years.

The Consultant shall follow Procedural Directive 80.1; Personnel Protective Equipment Use.

The Consultant Assistant Project Engineer, inspectors, and materials testing technicians shall be thoroughly familiar with CDOT's specifications, manuals, forms, documentation, and meet all CDOT's required certifications per CP10 of the most recent edition of the CDOT Field Materials Manual and as shown in the table at the end of this document.

The Consultant shall provide each of their project staff members a written copy of the approved task order to ensure that they understand their duties and requirements for the project.

Personnel provided by the Consultant who do not meet all of the specified requirements, or who fail to perform their work in an acceptable manner, shall be removed from the project when determined and directed by the CDOT Resident Engineer. CDOT will not pay for the Consultant employee's time incurred during the non-certification period.

The Consultant shall furnish all personnel, materials, equipment and transportation required to perform the work. Consultant personnel shall have appropriate vehicles (equipped with flashing amber beacon, proper personal protection safety equipment, and a cellular phone with a local phone number), computer and miscellaneous equipment (calculator, office supplies, safety equipment, etc.) required to perform the work. Computer equipment shall have MS Word, MS Excel, MS Project and/or *Primavera, a communications package capable of transmitting and receiving electronic messages, an internet email address, and sufficient memory to load CDOT SiteManager and the most current versions of CDOT QPM programs. Office space will be provided by Contractor pay item or provided by CDOT.

(*if Primavera is used, the Consultant will obtain a license for use from CDOT)

Personnel qualifications, staffing level, and number and types of vehicles shall be subject to the approval of the CDOT Resident Engineer. The Consultant shall assign personnel for the duration of the Contract subject to the approval of the Resident Engineer.

1.14 Documentation

Each of the Consultant's personnel shall maintain a daily diary for each day they perform work on the project on an approved form. CDOT's Form 103 or Automated Form 103a - Project Diary and Site Manager Diary (when Site Manager is used on the associated project). The contents of the diary shall be brief using accurate statements of progress and conditions encountered during the prosecution of the work. Editorial comments are not to be incorporated in the diaries or on any written correspondence applicable to the project. A copy of the daily diary shall be available for the CDOT Resident Engineer within one working day of its date.

1.15 Engineer's Certification

The CDOT Resident Engineer shall be the final authority regarding acceptance of work not conforming to the plans and specifications.

The Consultant Project Engineer shall provide daily or routine certifications as shown below. The Consultant Project Engineer in responsible charge of all the Consultant inspectors and material technicians shall provide this certification on a monthly basis:

"The items listed above this certification were tested or inspected and found to be in reasonably close conformity to the plans and specifications except as noted."

When performing Construction Management services the Consultant's Project Engineer shall also provide monthly certifications on monthly Contractor interim progress payments as shown:

"The construction on this project is being conducted in reasonable close conformance with the plans and specifications."

When performing Construction Management services the Consultant's Project Engineer shall also provide a final certification at the completion of the project as shown:

"The project has been completed in reasonably close conformity with the plans and specifications including authorized changes. The project has been reviewed for obvious safety deficiencies. The project Right of Way appears to be free from unauthorized encroachments resulting from construction on this project."

SECTION 2

Construction Management Requirements:

The following checklist shall be utilized to establish the Construction Management responsibilities of the individual parties for this project.

Description of Task		Consultant CDOT
1. Schedule, conduct, and prepare minutes of all Project Meetings as follows:		
(a). Weekly Project Meetings	X	
(b). Pre Survey Conference:	X	X
(1) Construction staking – Primary Control		X
(2) Survey Monumentation		X
(c.) Construction Communications	X	X
(d.) Pre Work Conferences	X	X
(e.) Contractor Weekly Safety “Tool Box” Meeting	X	
(f.) Utility Coordination meetings	X	X
(g.) Traffic Management meetings	X	X
(h.) Environmental and Erosion Control meetings	X	X
2. Construction Management:		
a. Professional Engineer (PE) registered in the state of Colorado, who will be “in responsible charge of construction “.	X	
b. Approval of Consultant PE		X

3. Public Relations		
(a.) Prepare and coordinate with CDOT and others to publish and distribute public notices of all planned construction activities and schedules to the media, property owners, local residents, tenants, and any other appropriate stakeholders affected by the project.	X	X
(b.) Perform public relation tasks with appropriate individuals as requested by CDOT.	X	X
(c.) Explain Construction and work with adjacent property owners to resolve issues that arise during construction.	X	X
(d.) Review and comment on Contractor's Public Information Plan	X	X

4. Construction Submittals:		
Note: This list is not all-inclusive and other submittals may require action as directed by CDOT.		
(a.) CDOT Form #205 – Sublet Permit Application, - Review, comment and approve after Form #713 has been checked by the Region EEO Administrative Program Specialist.	X	X
(b.) Method of Handling Traffic – Review and approve	X	X
(c.) Progress Schedules- Review and approve	X	X
(d.) Methods statements – Review and comment	X	X
(e.) Shop drawings per 105.02 – Review or submit to specialty unit	X	X
(f.) Working drawings per 105.02 – Review or submit to specialty unit	X	X
(g.) Other submittals per 105.02 – Review or submit to specialty unit	X	X
(h.) All EEO, Labor compliance requirements – Review and comment	X	X
(i.) Other submittals as directed – Review, comment and/or approve as needed.	X	X
(j.) Traffic Control Management plans, Method(s) of Handling Traffic – Review and approve	X	X
(k.) Construction inspection including calculations, measurements, and documentation of interim and final pay quantities – Review, comment and approve.	X	X
(l) Prepare CDOT Form 105 – Construction Memo for review, comment and approval.	X	

5. Perform required EEO/AA/DBE/OJT or labor compliance tasks as requested as follows:		
(a) Conduct Contractor/Subcontractors reviews to ensure conformance with the Equal Employment Opportunity (EEO)/Affirmative Action (AA)/DBE/OJT requirements contained in the Contract. (Standard Special Provisions, Project Special Provisions, and FHWA Form 1273)	X	X
(b) Complete and submit to the CDOT Region EEO Administrative Program Specialist the required number of CDOT Form #280 - Equal Employment Opportunity and Labor Compliance Verification.	X	X
(c) Monitor DBE participation to ensure compliance with the "Commercially Useful Function" requirements.		X
(d) Complete and submit to the CDOT Region EEO Administrative program Specialist the applicable number CDOT Form #200 - OJT Training Questionnaire, when project utilizes OJTs.	X	X
(e) Check certified payrolls to verify compliance with Contract requirements. The checking shall be completed by project personnel trained in payroll checking. (Contact the Region EEO Administrative Program Specialist for training requirements.)	X	
(f) Coordinate submittals by Contractor and all subcontractors of FHWA Form 1391 (Highway Construction Contractor's Annual EEO Report) to the CDOT Region EEO Administrative Program Specialist. The Report is due to the Region EEO Administrative Program Specialist by August 10 for all construction projects active during the last complete week of July.	X	

6. Materials:		
(a) CDOT Form #250 - Materials Documentation Record:		X
I) Fill out and distribute CDOT Form #250 before the Contractor commences work.	X	X
II) Complete Form #250 after work is completed. Distribute per instructions in CDOT Materials Manual.	X	X
(b) Approve changes to typical section (requires a CMO).		X
(c) Development, Checking, and Design mix approvals:		X

I) Concrete		X
II) Hot Mix Asphalt (HMA)		X
(d) Acceptance of manufactured products.	X	X
(e) Inspecting fabrication of structural steel and prestressed concrete structural components. PE inspects after delivery to site.	X	X
(f) Inspecting fabrication of bearing devices. PE inspects after delivery to site.	N/A	N/A
(g) Laboratory Check testing	X	X
(h) Acceptance testing	X	
(i) Independent assurance testing (Region Materials Laboratory will develop, complete, and distribute CDOT Form #379 - Project Independent Assurance Sampling Schedule.)		X
(j) Approve sources of materials in consultation with Region Lab.	X	X
(k) Ensure that COCs have been submitted prior to installation.	X	

7. Maintain time counts	X	X
8. Maintain Project files for all documentation	X	
9. Obtain, accept, or approve all required contractor submittals	X	X
10. Review or submit shop drawings to specialty units	X	X
11. Perform Traffic Control Inspections	X	X
12. Approve traffic signal equipment	X	X
13. Monitor Construction surveying	X	X
14. Monitor ROW monumentation	X	X

15. Prepare monthly estimates of the Contractor's work performed, materials placed or stockpile materials on hand in accordance with the Contract.	X	X
<u>NOTE: Only the CDOT Resident Engineer can approve and sign vouchers for interim and final Contractor pay estimates.</u>		

16. Review interim and final billings for Utility relocation work.	X	X
<u>NOTE: Only the CDOT Resident Engineer can prepare, approve and sign vouchers for interim and final Utility Company billings.</u>		
17. Prepare CDOT Form #90 - Contract Modification Order (CMO) and/or CDOT Form #94 Minor Contract Revision (MCR) including letter of explanation for CMO/MCR. The CPE is required to write the letter of explanations for review and acceptance by CDOT.	X	
<u>NOTE: The Consultant may negotiate costs for extra work but only CDOT can approve costs. Only the CDOT Resident Engineer can approve and sign MCR/CMOs for modifying CDOT's Contract or paying the contractor.</u>		
<u>Only CDOT or FHWA can approve Federal-Aid funding for MCRs/CMOs.</u>		

18. Monitor project financial status and submit monthly, in a format acceptable to the Resident Engineer, such as CDOT Form #65a - Project Financial Status Report.	X	X
19. Prepare and submit monthly progress reports to the Resident Engineer: CDOT Form #110a - Status of Active Construction Projects, and CDOT Form #517a - Status of Construction Project Finals.	X	
20. Prepare appropriate responses to Contractor, Subcontractor or supplier requests for information, submittals, disputes, claims, change notices, or other correspondence.	X	
21. Prepare response for CDOT Resident Engineer regarding Status of Claim.	X	
22. Prepare complete claim record.	X	
23. Give oral or written presentation to the Resident Engineer, Program Engineer and the Region Director for claims	X	

24. Give presentation for Dispute Review Board or AAA Arbitration board.	X	X
25. Conduct routine, random project reviews to ensure the project is being administered in accordance with the terms of the construction Contract.	X	X
26. Conduct final project inspection of completed or unacceptable work and prepare punch list for final acceptance.	X	X
27. Complete and sign CDOT Form #473	X	X
28. Complete the CDOT Form # 1199 check list at the project level	X	

29. Prepare and submit CDOT Form #1212a - Final Acceptance Report.		X
30. Prepare final project acceptance letter and distribute per procedures in the CDOT Construction Manual.	X	
31. Advertise for final settlement. (CDOT Staff Construction when CDOT is responsible.)		X
32. Maintain accurate as constructed notes and prepare as constructed plans per procedures in the Construction Manual.	X	
33. Check final quantities, final plans, and the final pay estimate.	X	X
<u>NOTE: Only CDOT can sign final pay estimate sheets and voucher</u>		
34. Generate or verify final earthwork quantities.	X	X
35. Check material records on a weekly basis.	X	X
36. Submit final materials certification (CDOT Form # 473)	X	X
37. Obtain and review CDOT Form #17 - Contractor DBE Payment Certification from the Contractor and submit to Region Finals Engineer.	X	
38. Complete and submit CDOT Form #950 - Project Closure.		X
39. Submit original of all project records to the CDOT Resident Engineer for review. Required revisions will be completed by the CPE. (CDOT will retain the project records for <u>six</u> years from date of project closure.)	X	

SECTION 3

Inspection Requirements:

3.1 General Work Descriptions

The consultant shall provide support to the CDOT and Consultant project staff through assignment of personnel to construction inspection responsibilities. Inspection work shall conform to the CDOT Construction Manual, the Inspector Checklist and SiteManager (when applicable on the project). Inspection responsibilities include but are not limited to the following:

3.2 Personnel Qualifications

Consultant inspectors shall meet the certification requirements as listed in *Table A* located at the end of this document, and as follows:

- The inspector (s) shall be certified per Chief Engineer's letter dated August 24, 2005. Copies of current certifications must be provided to the Project Engineer prior to acceptance to the project.

The qualification program products can be accessed both internally and externally at:

<http://www.dot.state.co.us/CHRMEmpCorner/empdev.cfm>

- The inspector (s) shall report with the following equipment; 25ft. tape measure, 100ft. tape measure, measuring wheel, 4ft. level, 10 ft. straight edge, digital cameral, round and flat shovel, string line, calculator, July 2006 M&S Standards, 2011 Standard Specifications for Road and Bridge Construction, MUTCD Part 6, including all revisions and updates., and a set of Project plans and Specifications. This list may be amended as needed for specific needs on the project.

3.3 Construction Inspection Requirements

The Consultant Inspector shall assist the CPE in performance of the following Construction activities:

Prepare and transmit updates of construction activities to the CDOT Public Information Office.

Periodic reports and billings required by CDOT Procedural Directive 400.2.

Perform initial, in-progress, and final inspections of work in progress including interim and final field measurements.

Monitor contractor payroll compliance.

Participate in weekly progress meetings with contractor, subcontractors, utility companies and other interested parties.

The following environmental related items shall be monitored on a daily basis.

- Project compliance with Environmental Requirements to minimize all construction related impacts to the unique, natural, visual, and cultural characteristics of the environment. Activities to be monitored will include drilling and blasting, shotcrete application, environmental monitoring of turbidity, staining and seeding and planting.
- Wetlands protection and encroachment.
- Environmental conditions and BMPs, ensuring that the Stormwater Management plans are properly implemented and maintained.

Check project documentation from the contractor.

Ensure that material certifications are submitted by the Contractor and approved prior to installation.

Anticipate potential project problems and recommend solutions to the CPE and the CDOT Resident Engineer.

Review drawings and data submitted by the construction contractor and suppliers for conformance with the project specifications.

Inform and obtain concurrence as needed from the CPE regarding changed conditions/situations in the field, and maintain relative documentation for project records.

Maintain accurate notes reflecting actual construction details to be used in preparation of "As-Constructed" plans.

Ensure compliance with the Traffic Management Plan.

Monitor compliance with and taking appropriate action to preserve safety on the project for all workers and traveling public in accordance with Method of Handling Traffic (MHT) and the Manual of Uniform Traffic Control Devices (MUTCD), OHSA, the project plans and specifications.

Initial, follow up, and final inspections of work in progress including interim and final measurements.

Photo document inspections during the course of the work.

Notify contractors and CPE of non-compliance with the contract plans and specifications.

Perform special tests, investigations, or monitoring as required to document project item acceptance.

Prepare and complete inspection documentation required for development of progress payments for the contractor in accordance with prescribed CDOT procedures.

Submit standard documentation reports no later than the following working day.

Prepare routine correspondence to the contractor, CDOT Staff, local agencies, etc.

Provide liaison and communication to Contractor field crews.

Assist in preparing punch lists of uncompleted work, non-conformance reports, and deficiency reports.

Review and submit final "As Constructed" plans, prepared and maintained by the contractor during construction and upon project completion.

Miscellaneous related duties as requested by the CPE.

Assist in preparing responses to contractors' and suppliers' requests for information, submittals, change notices, claims, and correspondence.

Some inspection activities may require the coordination with CDOT Environmental Staff

3.4 Documentation

The Consultant's project assigned personnel shall each maintain a daily diary for each day work on the project is performed. CDOT's Automated Form 103a – Project Diary shall be used, unless otherwise approved by the Engineer. The contents of the diary shall be brief and accurate statements of the progress and conditions encountered during the prosecution of the work. Editorial comments are not to be incorporated in the diaries or on any written correspondence applicable to the project. A copy of the daily diary shall be given to the Engineer within one working day of the date on the diary.

The Consultant's project assigned personnel shall each maintain notes, workbooks, records, or other documentation, on an ongoing basis, that can be used to recreate payment quantities, if necessary.

The Consultant's project assigned personnel shall submit all documentation as described in the Construction Manual prior to Contractor pay estimates being generated.

3.5 Submittal of Documentation

Documentation required at project end or suspension shall be submitted to the CDOT Resident Engineer within 20 working days after the date of work ending. Failure to submit the required final documentation may result in the withholding of Consultant's payments until the documentation is received.

SECTION 4

Materials Testing Requirements:

4.1 Project Standards

If the required method is not described in the CDOT Field Materials Manual, the required work shall be completed in accordance with:

AASHTO Standard Specifications for Transportation Materials and Methods of Sampling and Testing (as revised and supplemented), or The ASTM Standards and Tentatives, in this order.

Proposed work procedures shall be coordinated with the CPE prior to the start of work.

4.2 General Work Descriptions

The consultant shall sample, test, inspect and document all materials generated and produced on the project. This includes materials delivered to the project that are listed in the Summary of Approximate Quantities in accordance with the SCHEDULE in the Field Materials Manual, any materials necessary for a Design/Build project, materials that may be added to the project through contract modification, and altered material quantities whether increased or decreased. The CPE, inspectors and materials testing technicians shall be required to review project quantities on a weekly basis to ensure that sufficient tests have been performed for the material placed to date. The consultant shall also provide any other services as requested by CDOT.

Initial Project Meeting - The Consultant Project Engineer, Consultant Materials Testing Technician, CDOT Resident Engineer, and CDOT Resident Head Tester (Or Region Testing personnel) shall meet to coordinate and schedule the required work. The Consultant shall complete all work in accordance with the approved QA schedule in the CDOT Materials Manual.

Testing of materials that are specifically designated to be pre-inspected or pre-tested shall be performed by CDOT staff or the Consultant as requested by CDOT. The consultant shall document and transport samples of any and all materials to the CDOT Region Laboratory that are required to be tested by CDOT Central Laboratory unless they have been transported by the manufacturer. The items and test frequencies of tested materials shall be in accordance with the column titled "Central Laboratory" in the SCHEDULE.

The minimum number of tests required shall be in accordance with the Frequency Guide Schedule for minimum Materials Sampling, Testing, and Inspection in the Field Materials Manual. The Engineer may require additional testing or other services for adequate Quality Control or Quality Assurance.

The Consultant Materials Testing Technician and CPE shall review project quantities on a

weekly basis to ensure that sufficient tests have been performed for all material placed to date on the project.

Test results and observations shall be documented on proper CDOT forms and submitted to the CPE for approval. The CPE and the Contractor shall be promptly notified of any failing tests. This notification shall be on a CDOT form 626 or other approved form.

4.3 Personnel Qualifications

Personnel qualifications and staffing levels for the project shall be subject to the approval of the CDOT Resident Engineer and Region Materials Engineer.

The consultant supplied materials testing technicians (MTT) shall be assigned to the project unless otherwise approved by CDOT Resident Engineer.

Consultant materials testing technicians shall meet the certification requirements as listed in **Table A** located at the end of this document, and as follows:

- 1.) The materials testing technician(s) performing the tests must have a minimum of one year experience in each specialty field (soils, aggregates, asphalt paving, concrete, etc.) that is being tested.
- 2.) Technicians performing concrete tests shall be certified by the American Concrete Institute (ACI).

The Consultant Materials Testing Technician shall be thoroughly familiar with CDOT forms and documentation requirements. Personnel provided by the consultant who do not meet all of the specified requirements, or who fail to perform their work in an acceptable manner, shall be removed from the project when determined by the CDOT Resident Engineer.

4.4 Labor, Vehicles, and Equipment:

The consultant shall furnish all personnel, materials, equipment and transportation required to perform the work. CDOT will provide a field laboratory for the use by Consultant.

The following equipment shall be furnished by the consultant for this project in sufficient quantity and in good working order to ensure accurate performance of all work required in a timely manner:

- 1.) One Nuclear Moisture-Density Gauge. A backup Gauge shall be available on the project site.
- 2.) 2 Concrete air meters, 2 slump cones, and other concrete testing equipment.
- 3.) One set of sieves for aggregates and soil gradations
- 4.) One electronic scale or balance capable of measuring to nearest 1/100th of a gram.
- 5.) Sample containers and small tools

- 6.) Proctor equipment for soil curves and one-point tests
- 7.) Atterburg limits equipment.
- 8.) Concrete cylinder molds, which meet AASHTO requirements except paper molds, which shall not be used, and plastic molds shall not be reused.
- 9.) Cellular phone.
- 10.) Computer with printer and Microsoft office software or software compatible with CDOT communication needs.
- 11.) Miscellaneous equipment for performing the required soils, asphalt, and concrete tests

4.5 Documentation

The Consultant shall keep up to date documentation and calibration results on all testing equipment on project site. The documentation shall be on-hand prior to use of the equipment.

Each of the Consultant's employees assigned to the project shall maintain a daily diary for each day the Consultant employee performs work on the project. They shall use CDOT's Form 103 or automated 103a - Project Diary, or other form approved by the Engineer. SiteManager may also be required for documentation when applicable. The contents of the diary shall be brief using accurate statements of progress and conditions encountered during the prosecution of the work. Editorial comments are not to be incorporated in the diaries or on any written correspondence applicable to the project. A copy of the daily diary shall be available for the CDOT Resident Engineer's review within one working day of its date.

Test results and sample submittals transmitted to CDOT's Region Laboratory shall be recorded on appropriate CDOT Forms. The Consultant may use CDOT worksheets or worksheets approved by the CDOT Resident Engineer. CDOT Forms and worksheets are available through the CDOT Resident Engineer. The use of electronic worksheets is not permitted without CDOT approval.

The Consultant Materials Testing Technician shall furnish the CPE with original copies of all worksheets and test results on a daily basis. The Consultant Materials Testing Technician shall also keep the CDOT Form 626 up to date at all times and provide copies of this form to the Project Engineer within 12 hours. The CPE shall be informed immediately of any non-specification material. The Consultant shall provide the CDOT Form 626 to the contractor within 1 hour for any non-specification material.

The Consultant's project assigned personnel shall each maintain notes, workbooks, records, or other documentation, on an ongoing basis, that can be used to recreate payment quantities, if necessary.

The CPE shall have available all correspondence and applicable CDOT forms for the Resident Engineer or his authorized representative's review.

4.6 Assurance Sampling and Testing

The Consultant shall coordinate the schedule of the Independent Assurance Tests (IAT) for the project with the Region Materials Section in accordance with the CDOT Form 379. Advance notice of 48 hours is required for proper coordination.

4.7 Submittal of Final Documentation

Final documentation shall be submitted to the Resident Engineer within 20 working days after completion of all work. A completed CDOT Form 250 shall be submitted to the CPE 10 days after the Consultant Materials Testing Technician has been notified of final quantities. Failure to submit final documentation as required will result in withholding of consultant payments.

4.8 Specific Testing Requirements:

The Consultant shall sample, test, and document all materials generated and produced on the project. This includes materials delivered to the project that are listed in the Summary of Approximate Quantities or referred to in the Design/Build Plans and Specifications. The number of tests required shall be in accordance with the Schedule in the Field Materials Manual. Additional quantities may be added by Contract Modification Order, or plan approximate quantities may be increased or decreased. The Materials Testing Technician and Project Engineer shall review project quantities on a weekly basis to ensure that sufficient tests have been performed for all material placed to date. The consultant shall also provide any other services as requested by CDOT.

Testing of materials that are specifically designated to be pre-inspected or pre-tested by this or any other Department of Transportation shall remain the responsibility of CDOT. The Materials Testing Technician shall document and transport samples of any and all materials to the CDOT Region Laboratory that are required to be tested by CDOT regardless of pre-inspection or pre-testing responsibilities.

The items and test frequencies of CDOT tested materials shall be in accordance with the column titled Central Laboratory in the Schedule in the Field Materials Manual.

SECTION 5

Construction Project Schedule Analysis Requirements:

5.1 Prequalification

The Consultant shall be a Colorado Registered Professional Engineer and have at least five years acceptable experience in construction management and schedule analysis.

5.2 Initial Project Meeting

The Consultant and CDOT project personnel shall meet to coordinate and schedule the required work prior to active construction. The Consultant shall complete all work in accordance with the approved schedule or as approved by the Engineer.

5.3 Work Duration

Project Schedule Analysis will include the duration of the construction plus pre and post construction activities as required.

5.4 Schedule Analysis Requirements

The Consultant shall conduct an objective analysis of Contractor schedules and method statements based on the documents furnished by the Region. Each analysis shall assess the feasibility of the Contractor's project construction schedule and updates relative to the current stage of completion and the timely final completion according to the terms of the contract. Each analysis shall assess the role of the Colorado Department of Transportation (CDOT) and/or the Design Consultant (if applicable) in reference to any construction delays or contract changes. In the case of a dispute between CDOT and the Contractor regarding the project schedule, the Consultant shall investigate and determine the facts related to the dispute and evaluate the liability for any impacts incurred as a result of differing site conditions or changes to the contract. The Consultant shall not solicit work under this contract but will instead rely on CDOT to notify them that a dispute exists or is pending. The Consultant's work shall be for the use of CDOT and their legal counsel.

The associated cost worksheet for this work includes analysis of the contractor's initial schedule, twelve (5) routine monthly schedule update reviews, and a contingency amount for one (1) additional special schedule analysis for a possible unforeseen event or dispute. The contingency amount shall not be used by the Consultant without prior approval from the Engineer.

5.5 Schedule and Method Statement Analysis

The Consultant will, as required:

- Review the Contractor's planned schedule and method statements for compliance with contract requirements. Review all updated schedules and contract modifications.
- Assemble and review updated as-built data to verify the accuracy of the Contractor's actual construction progress and schedule feasibility. Provide ongoing schedule review and evaluation support through project completion.
- Perform a schedule delay analysis and determine the amount of Contractor and/or CDOT excusable delays. Assess the liability associated with any changes, extra work and /or delays in order to determine responsibility for impacts to the project schedule.
- Prepare written schedule reports and exhibits to assist in the evaluation of schedule delays and remaining as-planned work.
- Provide ongoing schedule review and evaluation support through project completion.

The Consultant's services may be undertaken in any portion or combination of phases as requested by the Region as follows:

Phase I. Preliminary Investigation and Evaluation

- A. Conduct an initial site visit and meeting with the Region's key personnel involved in the project.
- B. Review all contract documents to include the contract between CDOT and the Contractor and the agreement between CDOT and the Design Consultant (if applicable) in order to determine the responsibilities and required conformance of all the parties.
- C. Perform Schedule and Method Statement Analysis as per the previous section in this scope of work.

Phase II. Ongoing Analysis

- A. Acquire copies of any additional project records as required, including, but not limited to: CMOs, MCRs, Memos and other relevant project documents.
- B. Conduct periodic site visits to confirm the as-built progress of the Contractor and meet with the Region's key personnel involved in the project.
- C. Review all available updated schedule information with respect to the construction of the project and any delays that might have occurred.
- D. Prepare an assessment of the outstanding issues and problems, highlighting the

liability of the Department, the Contractor, Subcontractors and/or the Design Consultant (if applicable).

Phase III. Final Report

- A. Prepare a draft report of findings, including an assessment of the Department's and Contractor's liabilities and a determination of the additional costs incurred by the Contractor for which either the CDOT or the Contractor may be liable.
- B. Arrange a meeting with the Region to review the draft.
- C. Prepare a final report to reflect comments and additional information received during the review with the Region.

Phase IV. Final Report (Contractor Dispute)

Prepare a draft report of findings, including an assessment of the Department's and Contractor's liabilities and a determination of the additional costs incurred

Appendix 1

Table A

Required Qualifications for Inspectors and Testers

Consultant Personnel	WAQT C Soils	ACI Field Testing Technician	ACI Transportation Construction Inspector		CRMCA Pavement Inspector	ACI Lab Technician	ACI Strength Technician	Tester CAPA LabCat	Inspector CAPA Inspector	CDOT Core Curriculum 3 Testing Elements	Erosion Control Supervisor
			In-Training	Inspector							
Testers	X	X			*X	X	**X	X		X	
Inspectors	X	-		*X	*X				X	X	X

*Certification in either the ACI Transportation Construction Inspector program or the CRMCA Pavement Inspector program is acceptable.

**ACI Strength Testing Technician certification is required to conduct flexural strength testing.

ACI Laboratory Aggregate Testing Technical or LabCat Level E certification is required to conduct sand equivalent testing.